63-2-3

TECHNICAL REPORT #6

January 1963

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Prepared for:

Office of Naval Research
Group Psychology Branch

Contract Nonr-1866(43)
NR 170-518

SOME FACTORS AFFECTING DISAGREEMENT IN A SMALL GROUP[1]

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In a previous study of the behavior of small groups in a simple task, it was found that the manner in which decisions are made can be influenced in the extent people will disagree (Shapiro, 1961).[2] If a successful outcome is made contingent on the occurrence of disagreement, rate of disagreement will either remain constant or increase whereas this change in rate does not occur in groups reinforced at random. With the accumulation of experiences of success for disagreeing, the wide variation from group to group of initial tendency to disagree appears to decrease. The effects of reinforcement were also found to be greater if the task situation is relatively unambiguous, ambiguity defined as increasing as number of choice alternatives increases.

In the present study, it is our aim to determine the effects of several stimulus and population variables on rate of disagreement under conditions in which groups receive non-contingent reinforcement, that is, success is random.

The stimulus variables are complexity of task, ratio of successful to total outcomes, and time or experience in the task. We expected more disagreement the more complex the task requirements, the less successful the group in achieving decisions, and the less experience in the task.

The population variables are sex, college or non-college experience, and science or non-science interests. We expected more disagreement in men than in women, in college than in non-college subjects, and in science than in non-science majors.

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[1] We are grateful to P. Herbert Leiderman, Gilbert Levin, and Bernard Turaky for aid in the planning and execution of this study.

[2] Shapiro, D. The reinforcement of disagreement in a small group. Technical Report No. 2, September 1961, ONR Contract 1866(43), Group Psychology Branch.

Method

Experimental Procedure

The basic experimental situation is a "contrived" game. A group of three subjects (Ss) sits around a table on which is placed a panel of colored lights. Each S has before him a small control box with a like number of buttons on it corresponding in color to the lights in the center of the table. The lights on the central panel go on when all Ss press the appropriate button simultaneously.

The following instructions were used:

> Now we want you to take part in a guessing game. This is how it works. In the other room I have a long list of colors written down, and you have to guess each color on my list and try to get as many right as possible. Your job is to talk it over with each other and decide what the color is each time. As you do, please discuss how you arrived at your decision, and also name the color you are going to choose for each guess. Speak distinctly so that you can be understood. As you do, please discuss how you arrived at your decision, and also name the color you are going to choose for each guess. Speak distinctly so that you can be understood. As soon as all three of you agree on a color, you stop talking and turn on the light by pressing the button of the color on the box in front of you. All three buttons have to be down for the light to go on. You keep the light on until you find out whether you guessed right or wrong. If you guessed right, you will hear a sound like this (tone). If you guessed wrong, you will hear a sound like this (buzzer). As soon as you find out how you did, turn off the light. Whether you guessed right or wrong, I'll go on to the next color on my list and you have to guess that one. It may be the same color as the last one, or it may be different.

Let's try one for practice. Suppose you all talked it over and agreed on red. (They do. Buzzer.) That means your guess was wrong. (If they do not follow instructions correctly, they are told: You hold the button down until you find out whether you guessed right or wrong.) Try red again. (They do. Tone.) That's right. The colors are red, gold, green, yellow, brown, and silver. Remember, all three of you discuss how you arrived at your decision each time. Try to get as many right as possible. Any questions?

Ss were required to hold the button down for five seconds after which the tone (right) or buzz (wrong) was sounded for one second. The tone was a pleasant sound, the buzz unpleasant. The time for decision was free to vary and was completely controlled by groups of Ss. Each decision constitutes a trial.

Disagreement in achieving a decision was defined as follows: a color suggestion initiated by one of three Ss is followed by a different color suggestion by one or both of the other Ss. Two and three-person disagreements were not distinguished in the analysis. The specific resolution of disagreement was not a criterion of success or failure. The actual name of a color had to be used for a color initiation to be counted as such.

Experimental Design

"Right" and "wrong" were pre-determined by a random schedule of reinforcement assigned to each condition. Reinforcement was not dependent on the decision process or on any specific color choice in a group.

There were 24 groups of three Ss, each run in two sessions about a week apart. In conditions A and B, reinforcement ratio was held constant at 1/3 in both sessions, but the number of colored lights was varied, either three or six. In A_1 the experimental order was three lights in the first session and six in the second; in B, the order was reversed. It was assumed that the six choice alternatives made the task more complex than three alternatives.

In conditions C and D_2 the number of colored lights was kept constant at three, but ratio of reinforcement was varied from 1/6 to 2/3. In C, the order was first 1/6 than 2/3; in D_2 first 2/3 then 1/6.

For each condition, there was one group each of college male non-science, college female non-science, college male science, and college female science Ss. Two groups of housewives were also run in each condition. Ss were paid at the rate of $1.50 per hour.

In each session, groups were given 100 trials or as many trials as occurred in an hour and a half, whichever occurred first.

Results

The data on disagreement are given in Table 1. In both sessions of five of the groups and one session of a sixth (starred in the table), discussion time was so long that 100 trials were not completed within the hour and a half time limit. For comparisons, the number of disagreements was figured proportional to the number of trials completed. These six groups, it may be noted, were composed of non-science or non-college subjects.

The number of disagreements ranged from 2 to 52 with a mean of 15.3 in the first session and from 0 to 44 with a mean of 11.4 in the second session in the 24 groups. Twenty groups showed a decrease in total number of disagreement from first to second session while one did not differ ($p < .01$, Binomial Test). The decrease was not a continuous fall over time from session to session; in fact the first half of the second session showed a greater number of disagreements than the second half of the first session (in 17 out of 24 groups). Although the number of disagreements decreased within each session, the decrease in the second session was not as great as the decrease in the first.

Differences between populations in rate of disagreement, combining results for men and women, were statistically significant ($p < .001$, Kruskal-Wallis).

Table 1

Number of Disagreements per Session

Condition	Reinforcement Ratio	No. of Colors	Session	POPULATION						
						Science		Non-science		
				Housewife		Male	Female	Male	Female	Mean
A	1/3	3	1	24*	9	2	8	10	30*	13.8
	1/3	6	2	14	8	0	5	7	20*	9.0
B	1/3	6	1	9	13	10	5	18	23	13.0
	1/3	3	2	16	9	2	2	17	12	9.7
C	1/6	3	1	7	14	2	8	52*	4	14.5
	2/3	3	2	3	15	0	7	44*	6	12.5
	2/3	3	1	11	22*	9*	18	27	32*	19.8
	1/6	3	2	3	10*	9*	15	23	26*	14.3
			MEAN	11.7		4.2	8.5	24.8	19.1	

The mean number of disagreements was 22.0 for non-science students, 11.7 for housewives, and 6.4 for science students (Table 1.). It is apparent that significance of this result is accounted for by the non-science student sample which is atypical in its high rate of disagreement. This sample of students, it may be noted, was composed for the most part of students in art and music schools.

Comparing male and female college students, including both science and non-science samples, rates of disagreement were about the same, 14.5 and 13.8 respectively. It is apparent from Table 1 that the science-non-science differences override the sex differences.

As to the complexity of the task and ratio of task reinforcement, the results were completely negative. Varying number of lights (three or six) or amount of reinforcement (1/6 or 2/3) did not significantly affect rate of disagreement.

Finally, it is important to observe that groups tended to maintain a relatively consistent rate of disagreement in both sessions. The rank-order correlation on number of disagreements between sessions 1 and 2 for all 24 groups, disregarding condition, was .85 ($p < .01$). Thus, even though populations differed in rate of disagreement, differences between groups tended to be consistent over time.

Discussion

The major finding of a decrease in disagreement over time may be attributed to two factors. One is a tendency for disagreements to decrease as the group develops and stabilizes a procedure for playing the game and making decisions. For example, in some of the groups, we observed that after an initial series of trials and orientation in the task, Ss started to take turns on successive trials. In other groups, a single S, after an initial period of

jockeying, assumed a more dominant role in the decision making and others accepted his leadership. These ways of interacting resulted in less disagreement.

A second factor, not unrelated to the first, is a probable loss of interest in the game over the course of the sessions which leads to a decrease in total amount of interaction or discussion. The level of motivation appears to revive momentarily at the beginning of the second session with a corresponding brief rise in rate of disagreement but then a subsequent fall-off. The correlation of interest, amount of discussion, and number of disagreements has been seen in an exploratory study (unpublished) in which reinforcement was made contingent on amount of interaction or time per trial.

As to the population differences, these correspond to some extent with differences observed in approaches to the problem. Science students tended to use a logical or mathematical approach, the housewives leaned mainly on color associations, and non-science students followed their intuitions. The different ways of handling the problem seem to have an ordered probability of disagreement.

The logical approach is to discuss which hypothesis may be correct and, after a hypothesis is decided on, a color is suggested which fits the hypothesis. Disagreement may occur at the hypothesis stage but usually not at the color suggestion stage, and thus does not result in disagreement as here defined. If a guess is not right, it means an incorrect hypothesis was used with a resulting discussion of change in the hypothesis, not color change per se, and therefore a relatively low number of disagreements.

Examples of color association are such statements as, "I have a red living room so let's push red," or, "I feel depressed; let's push blue for depression." Disagreements may arise here when there is no appropriate light for the

associated object so that Ss have to decide which color on the panel is closest to the one suggested. Or individual Ss may pursue different trains of thought. In other words, Ss may disagree but not necessarily to maximize their success in the task.

An intuitive approach is exemplified by such statements as, "Red is going to be right this time; push it quick," or, "Let's choose blue on a hunch (unstated)." Such Ss may refuse to accept any color other than the one they "feel" at that moment. Two different "feelings" on the same trial result in a disagreement. The intuitive approach is akin in some ways to extra-sensory perception.

In examining these approaches to the problem it would seem as if individual vs. group involvement in the solution may be an important dimension. That is, for some of the Ss using a logical approach, it seemed more important that a guess or hypothesis be tested out and found correct and not as important for the group to achieve success. For others, the logical approach leans heavily on a clear-cut system which was felt by these Ss not to be a matter for discussion. The color association approach, on the other hand, emphasizes individual as well as group association. Subjects using this approach seemed to enjoy the game with little emphasis on success as such. Both logical and color association approaches have in common a concern for external frameworks or objects, and in this sense, are more socially-oriented than the intuitive approach which appeared to be both intensely subjective and individualistic.

These interpretations, coupled with Vinacke's suggestion (1959) that in game behavior men are primarily concerned with winning, whereas women are more oriented towards working out an equitable outcome, would lead us to expect a greater male-female difference. The disagree-

ment rate was slightly higher for men than for women although not significantly, suggesting that the importance of winning for Ss may not have been a crucial variable in the game used.

The non-significant differences in disagreement as a result of variations in complexity of task or amount of reinforcement support this last conclusion. Given a basically ambiguous problem slight changes in stimulus conditions and in success do not seem to have any gross effects on disagreement in achieving decisions.

As an alternative interpretation, a simplification of the stimulus conditions may decrease one kind of complexity while at the same time increasing another. Changing from six lights to three actually increases the amount of information given on each trial but decreases the number of alternatives to discuss and choose from.

Reinforcement rate may be seen in the same light. A low rate of reinforcement means little feedback and may lead Ss to reject all hypotheses whereas a high rate means a great deal of feedback and may lead Ss to accept all hypotheses. The relationships between task complexity and ratio of success with disagreement may therefore be more complex. If disagreement in a simple ambiguous task is to be studied as a function of stimulus conditions, we need to know more about what factors lead to more or less complexity, ambiguity, or information.

Summary and Conclusions

We have studied the degree to which groups of three persons disagree in achieving decisions in a simple task as a function of several experimental and subject variables.

Variations in complexity of the task situation and in success in achieving decisions were found to be insufficient to alter rate of disagree-

ment.

A significant decrease in rate of disagreement occurred from one group session to the next. This decrease, it was suggested, may be due to adaptation in the situation itself and to the development of a stable interaction procedure among subjects.

A difference in rate of disagreement was found related to the population from which the subjects were drawn. This was hypothesized to be a function of methods of approach in solving the problem.

Groups tended to maintain consistent levels of disagreement in two sessions regardless of change in the stimulus conditions of the task.

It may be concluded that disagreement as a process of interaction in achieving a decision is more closely related to the individuals in a group and to their characteristic ways of approaching a task than to the characteristics of the task itself, at least in the laboratory situation used. In studying how people interact in achieving decisions, we need be less concerned with the objective characteristics of the task and more with the ways people approach and interact in finding solutions to problems.